

# Achieving Greater Demand Response in New England: Evolving from Programs to Markets

*Presented by:*

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# What is Demand Response?

- **Reliability-Based Demand Response:**

- Customers reducing their consumption in response to system conditions as determined by the ISO New England system operators.
  - Some demand response resources (like generators) need to be centrally controlled to respond to real-time contingencies.

- **Price-Responsive Demand:**

- Retail customers changing their consumption behavior in response to a financial incentive.
  - Ideally, such incentives should be provided through retail prices.
  - In New England, however, such incentives are provided through ISO-NE administered wholesale market price response programs.

# Why is Demand Response Important?

- **Reliability Benefits:**

- Demand response that is centrally controlled provides planning and operational reserves to address system contingencies.
- Demand response can be implemented rapidly; once in place, it can respond quickly to address real-time system needs.

- **Regional Economic Benefits:**

- Existing resources are used more efficiently.
- The need for additional capacity is reduced.
- Price volatility and average prices for all customers are reduced.
- The need for regulatory intervention (e.g., price caps, market monitoring and mitigation) is reduced.
- Retail customers receive services that best meet their needs at lowest cost.

# What Limits the Use of Demand Response as a Reliability Resource?

- Availability
  - Can I call on this resource to respond at any time?
- Size of response
  - Is this resource big enough to improve reliability?
- Confidence in response
  - How quickly can DR assets respond?
  - Can DR assets maintain response over time?
  - How direct is the control over the resource?
- Ability to monitor DR asset status in real-time
  - Individual DR assets are small (reliability resources are 2 MW and price resources are 300 kW on average) and disbursed; generation-based telemetry may be prohibitively expensive.

# What Limits the Development of Price-Responsive Demand?

- **Wholesale and Retail Markets are Disconnected!**
- Currently, none of the New England States require default service to be priced on a dynamic basis.
- Because retail prices are flat, customers and suppliers are not economically motivated to modify consumption behavior or to install advanced metering and control technology.
- Few suppliers are offering retail rates that are linked to wholesale prices.
- **ISO New England has implemented price-response programs because demand response is not fully integrated into wholesale and retail markets.**

# Demand Response Included ISO-NE Regional System Planning

- **Demand-response resources are integrated into New England's Regional System Planning (RSP) process:**
  - Reliability-based demand-response is integrated into the RSP as a supply resource (modeled like generation).
    - Reliability-based demand-response resources are dispatchable.
    - Taken into account when determining loss-of-load expectations and installed capacity requirements.
  - Price-responsive demand (“economic demand response”) is integrated into the RSP as a reduction in demand.
    - Like energy efficiency, price-responsive demand is taken into account in the load forecast.
    - Load forecasts would have been higher but for energy efficiency and price responsive demand.

# Short-Term Goals:

- **DR programs are a transitional tool**
  - Programs allow demand-response resources to demonstrate value in different markets (energy, capacity, and reserves) without requiring direct participation in such markets.
    - Avoids certain communication, telemetry, and system infrastructure issues and costs.
    - However, incentive payments for load reductions are “out-of-market” resulting in transfer payments and subsidies.
  - Programs provide retail customers with information, training, and education.
    - Customers learn the actions they can take to respond to price or emergency conditions.

# Short-Term Solution (ISO Programs):

- **Reliability-Based Demand Response:**

- Real-Time Demand and Profiled Response Programs
  - SWCT “Gap” RFP
  - Winter Supplemental Program
- Demand Response Reserves Pilot (approved 11/29/05)
  - Demonstrate the ability of different types of DR resources to respond to contingencies.
  - Give system operators data and confidence in DR resources.
  - Develop lower-cost, functionally equivalent telemetry.

- **Price-Responsive Demand:**

- Real-Time Price Response Program
- Day-Ahead Load Response Program

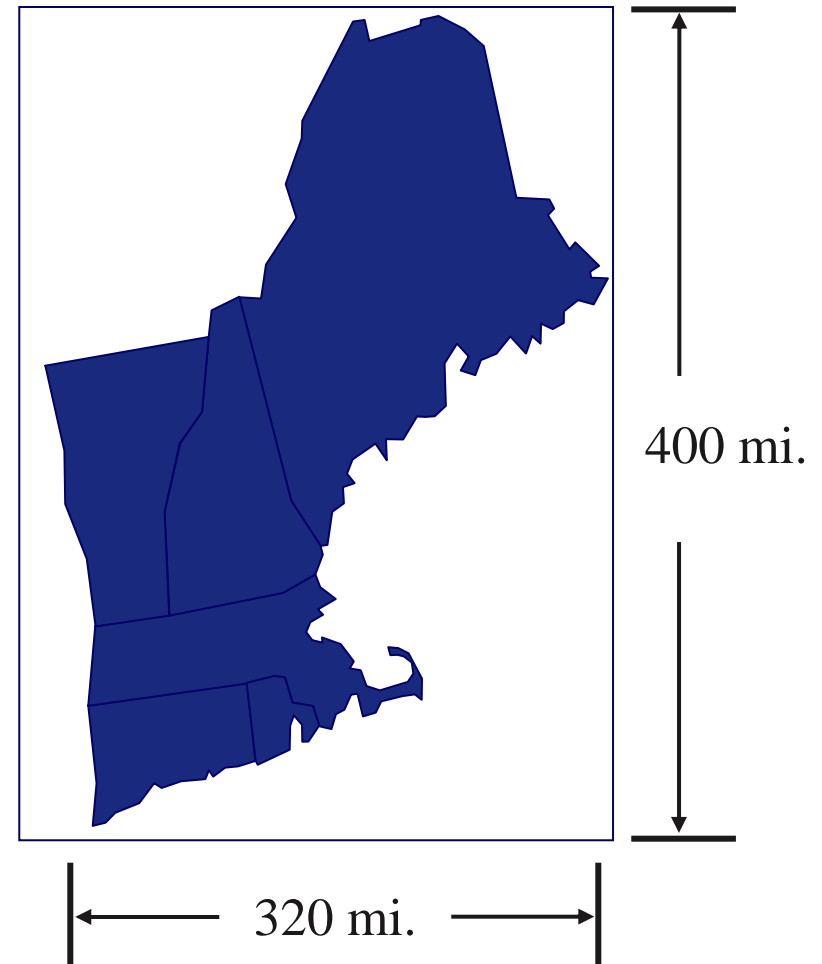


# Long-Term Solutions (Market-Based):

- **Integrate demand response into wholesale and retail markets**
  - To better capture reliability-based demand response:
    - Implement capacity and Ancillary Services Markets so that markets incent investment in demand response.
      - Our experience with the SWCT Gap RFP and Winter Supplemental Program shows that if resources are valued, they will respond to system needs
    - Enable demand response to provide **functionally equivalent** capacity and reserve products in these markets.
  - To better capture price-responsive demand:
    - Link retail rates to Real-Time and Day-Ahead LMPs and capacity prices – i.e., implement dynamic retail pricing.
      - Encourage the States to implement dynamic retail pricing and associated advanced metering, billing systems, and customer education programs.
      - States within the same region ought to coordinate dynamic pricing policies.
    - Phase out ISO-administered price-based programs.

# New England's Electric Power System

- 14 million people; 6.5 million households and businesses.
- 350+ generators/power plants
- 8,000+ miles of transmission lines.
- 12 interconnections to neighboring systems.
- 31,000 megawatt total supply.
- ~27,000 megawatts peak demand.
- ISO New England – a private, not-for-profit corporation created in 1997 responsible for:
  - Power system reliability
  - Market operations
  - Regional system planning



# Demand Response Programs Cumulative Enrollments

